ADDITIONS AND CORRECTIONS TO THE REVISION OF NORTH AMERICAN VESPINAE (ENTOMOLOGICA AMERICANA, 1932). SECOND PAPER.

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Since the first series of Additions was published in this Bulletin (1935, XXX, pp. 119–124), some valuable contributions have been made to the biology of North American Vespinae, notably by W. V. Balduf (1936), P. Rau (1938), R. G. Schmieder (1939) and L. H. Taylor (1939). But the outstanding work is C. D. Duncan's book (1939), which should stimulate interest in these and other social insects.

Additional Records and Observations.

Vespa crabro var. *germana* Christ.—The earliest published record of the introduction of the European hornet into the United States, by H. de Saussure (1868), seems to have been overlooked. There are recent trustworthy records of this wasp from Quebec, where it was taken in 1924 (T. J. Headlee, 1926) and North Dakota, where a male was taken at Tioge, in September, 1933, by D. E. Hardy (C. L. Hayward, 1937). In both cases the specimens may have been imported accidentally and further proof is needed that the species has become established there. *V. crabro* is now thoroughly at home in southwestern Connecticut, Long Island, Staten Island and most of New York State (Ithaca, one queen taken in 1936 by J. G. Franclemont), New Jersey, eastern Pennsylvania, Delaware, Maryland and the eastern part of West Virginia (L. H. Taylor, 1940). No doubt this powerful insect will eventually spread over most of eastern North America.

Vespula vulgaris (Linnaeus).—I have seen males from Idaho (Chatcolet) and Quebec (Outremont; Montreal); and queens and workers from South Dakota (Englewood), Wisconsin (Vilas Co.), and Ontario (Macdiarmid, Lake Nipigon; Low Bush, Lake Abitibi; De Grasse Pt.). According to L. H. Taylor (1940) it occurs in West Virginia.

Vespula maculifrons (R. du Buysson).—I have seen males from Quebec (Outremont), Pennsylvania, and Kentucky (Lexington); and queens and workers from Oklahoma (Le Flore Co.; Flint; Grove; Broken Bow; Latimer Co.; Barnard; Jay; Pawnee; Murray Co.; Osage Co.; Stillwater; Smithville), and Wisconsin. L. H. Taylor (1940) lists it from West Virginia.

V. maculifrons and *V. pensylvanica* are sometimes very similar in color, but there seems to be one reliable difference, overlooked thus far. The median, diamond-shaped black mark of the first tergite is long and narrow in *V. pensylvanica,* being usually as long as or longer than wide. In *V. maculifrons* it is as a rule transverse, much wider than long. This holds true in all the queens I have examined and in most workers. Sometimes in *V. maculifrons* the median black area fuses with the lateral black spots. In the shape of the median spot, *V. pensylvanica* agrees better with the Palearctic *V. germanica,* to which, moreover, it is most closely related in structure.

Vespula rufa var. *intermedia* (R. du Buysson).—I have seen it from Alaska (♀, Rampart), North West Territory (McLeod Bay, Great Slave Lake), Labrador (♀, Cartwright; and Anatalak Bay, Nain), and Quebec (♀, Longueuil).

Vespula rufa var. *vidua* (H. de Saussure).—I have seen it from Iowa (Page Co.), West Virginia (Berkeley Spring, Morgan Co.; see L. H. Taylor, 1939 and 1940), New Hampshire (N. Conway), and New Brunswick (Painsec).

Vespula rufa var. *sladeni* J. Bequaert.—I have seen it from Alberta (Nordegg; Jasper) and Washington State (Waitsburg; Blue Mts.; Pullman).

Vespula rufa var. *consobrina* (H. de Saussure).—I have seen it from Manitoba (Cedar Lake) and Delaware (Dover). L. H. Taylor (1940) reports it from West Virginia.

Vespula rufa var. *acadica* (Sladen).—I have seen it from Labrador (Anatalak Bay, Nain), Ontario (Ottawa; Macdiarmid, Lake Nipigon), and New Hampshire (N. Conway).

Vespula austriaca (Panzer).—I have seen additional specimens from Idaho (Moscow Mt., 1♀), Ontario (Low Bush, Lake Abitibi, 2 ♀; Macdiarmid, Lake Nipigon, 1 ♀), Alberta (Fawcett, 1 ♀; Nordegg, 2 ♀), and Oregon (Lucky Boy Camp, Blue River, 1 ♂).

Vespula squamosa (Drury).—A queen was taken at Mt. Pleasant, Iowa, in early spring (March 30, 1934), from under the bark of a hickory log by Mr. Millspaugh. The collections of the University of Nebraska contain a queen taken at South Bend, Nebraska, by Mr. E. G. Anderson. I have also seen this wasp from Michigan (South Haven, one queen, June 23, 1938; collected by C. W. Sabrosky), Kentucky (Lexington), northern New Jersey (Englewood Cliffs opposite New York, September, 1939; 1 ♀ taken by R. R. Dreisbach), West Virginia (Berkeley Springs, Morgan Co.; see L. H. Taylor, 1939), Oklahoma (Ottawa Co.; Nashoba; Aroke Co.; Wilburton; Flint; Sallisaw; Stillwater; Grove; Wyandotte), and Mexico (Tlalpam near Mexico City).

Vespula sulphurea (H. de Saussure).—I have seen this species from Oregon (7 miles W. of Butte Falls, 1850 ft., 1 ♀, Aug. 15, 1935; H. A. Scullen).

Vespula maculata (Linnaeus).—I have seen this species from Quebec (Arundel; Berthierville; Lac Nominque, Labelle Co.), Kentucky (Rivens; Farmers; Lexington), Oklahoma (Ottawa Co.), Saskatchewan (Indian Head), and North West Territory (Lake Sarahk; Hay River Post on Great Slave Lake). L. H. Taylor (1940) reports it from West Virginia. Sarahk Lake (63° 45′ N.) and Hay River Post (60° 51′ N.) are much farther north than any previously known locality of *V. maculata.* Normally this species builds aërial nests; but this summer (1940) I have observed it nesting underground, in a cavity of a gravel slope (N. Conway, New Hampshire).

Professor H. A. Scullen caught a worker of this species (10 mi. S.E. of Lebanon, Oregon) carrying off a worker of *Vespula vulgaris.*

Vespula arenaria (Fabricius).—I have seen it from North West Territory (McLeod Bay on Great Slave Lake), Iowa (Page Co.; Dickinson Co.), Labrador (Mud Lake), Newfoundland (St. Anthony), Nevada (Elko; var. *fernaldi* Lewis), and Nebraska (Spencer; etc.).

Professor H. A. Scullen bred from a nest of *V. arenaria,* at Corvallis, Oregon, three females of the parasite *Sphecophaga.* These were sent to Mr. R. A. Cushman, who informs me that they "apparently represent the summer generation of an undescribed species, although they may come within the variation of *S. burra* (Cresson). The specimens differ rather consistently from summer generation eastern specimens (*burra*) not only in being more extensively red, but also in several structural details." This appears to be the first record of *Sphecophaga* from the Pacific States and the third known host species.

The eastern *Sphecophaga burra* (Cresson) has been bred thus far from *V. maculata* (W. Couper, 1869; J. L. Zabriskie, 1894; R. A. Cushman, 1933; R. G. Schmieder, 1939) and *V. rufa* var. *vidua* (L. H. Taylor, 1939). It is probably a common parasite in the eastern United States and Canada. At the Boston Museum of Natural History, there are specimens (none bred) from several localities in New Hampshire (Jaffrey) and Massachusetts (Chester; Gloucester; Dedham).

Vespula norwegica var. *norvegicoides* (Sladen).—I have seen it from Manitoba (Gillam; Herchmer), North West Territory (Fair-

child Pt., Great Slave Lake Region), and Labrador (island near Hopedale; five workers taken by Junius Bird from a nest under a flat stone in an Eskimo house). L. H. Taylor (1940) records it from West Virginia.

Vespula norwegica var. *albida* (Sladen).—Many workers and males of this Arctic form were taken by R. H. Daggy and D. G. Denning in Manitoba (Churchill; and on the Churchill River, 20 mi. S. of Churchill), early in August, 1937.

Vespula adulterina (R. du Buysson).—In southern Alberta one finds the typical form, as well as transitions to var. *arctica* (with spots on second tergite, but none on postscutellum).

Vespula adulterina var. *arctica* Rohwer.—I have seen it from northern Alberta (Peace River, Athabasca) and Nebraska (West Point). L. H. Taylor (1939 and 1940) found it in West Virginia.

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